Distribution Construction

Inspection Findings

New England Pipeline Safety Seminar
October 20, 2010

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MISSING IN ACTION

Topics of discussion for today:

a. Handling of Pipe

b. Pipe Joining

c. Pulling Pipe in Trenchless Construction

d. Separation Distance

e. Grounding Equipment

f. Squeeze off

g. Depth of Cover

h. Backfill

§192.59(a)(3)
Plastic Pipe

New plastic pipe is qualified for use … if it is free of visible defects.

Each length of pipe and each other component must be visually inspected at the site of installation to ensure that it has not sustained any visually determinable damage that could impair its serviceability.

Repair of Plastic Pipe

Each imperfection or damage that would impair the serviceability of plastic pipe must be repaired or removed.

...if it is free of visible defects.


Right in the area to be joined...

Case study:

- The Operator installed a 2” plastic gas line with a gouge greater than 10% wall loss, the Operator did not know how to measure the defect nor did the Operator have any equipment to measure the defect.

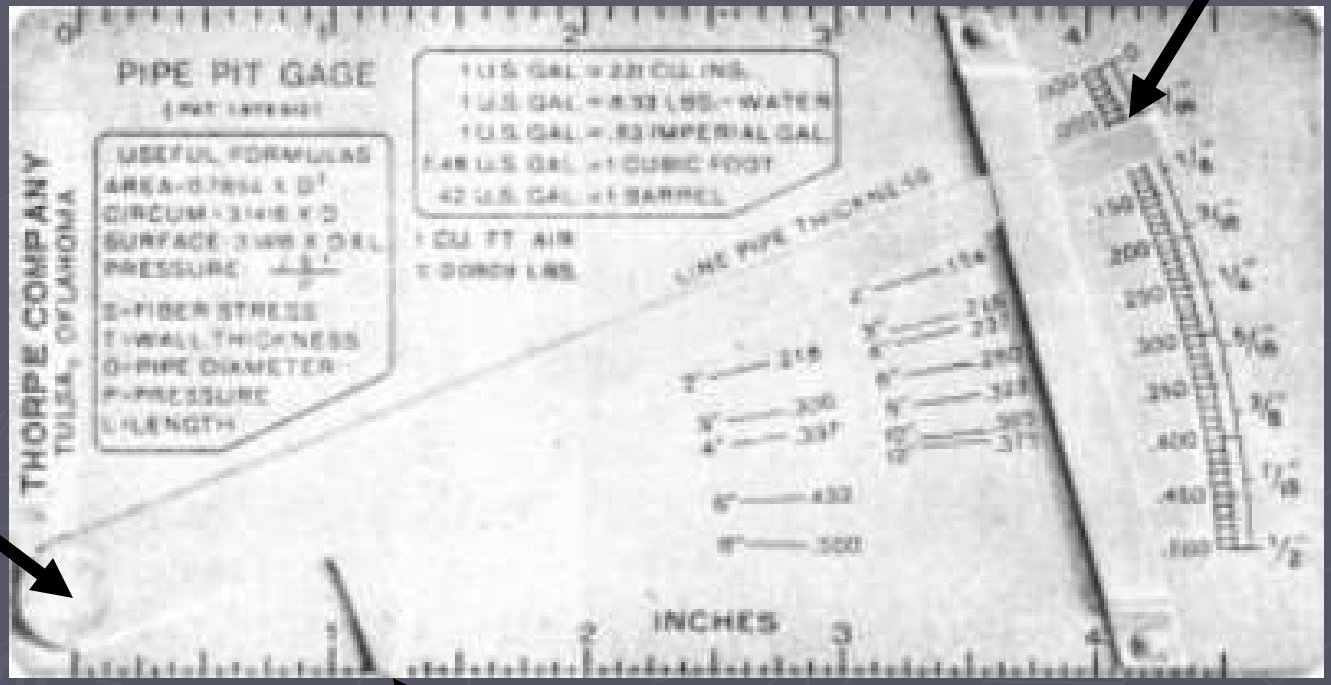
How do you measure a defect?

There are many types of pipe in service with different wall thicknesses

so you need the right tools for the job.

And you need to know how to use them.

Pipe Pit Gage

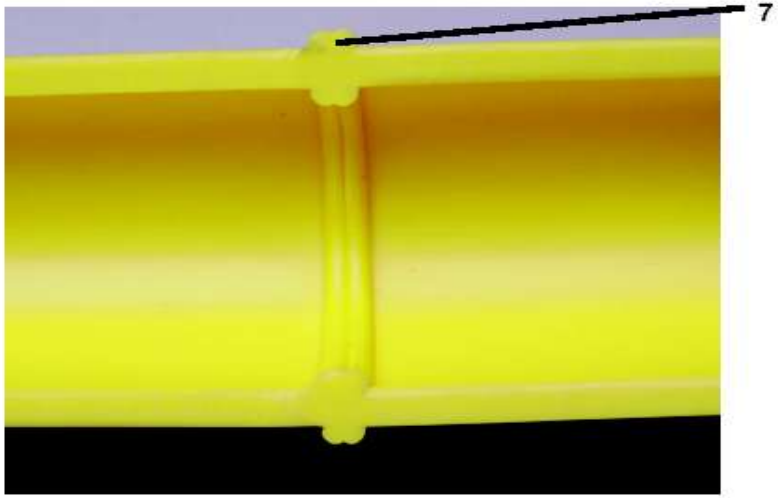


Digital Pipe Pit Gage

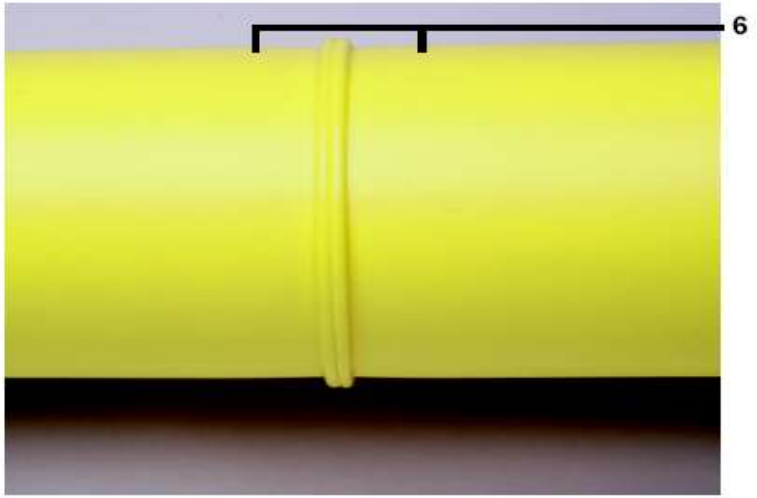
(b) Each joint must be made in accordance with written procedures that have been proven by test or experience to produce strong gastight joints

ACCEPTABLE FUSIONS

5. Proper double roll-back bead
6. Proper alignment



7. Proper double roll-back bead



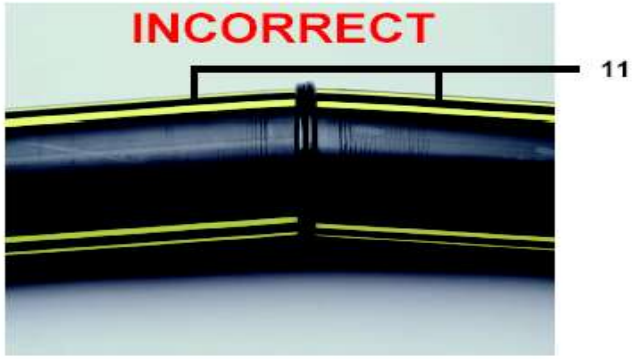
6. Proper alignment

8. No gaps or voids when bent

UNACCEPTABLE FUSIONS

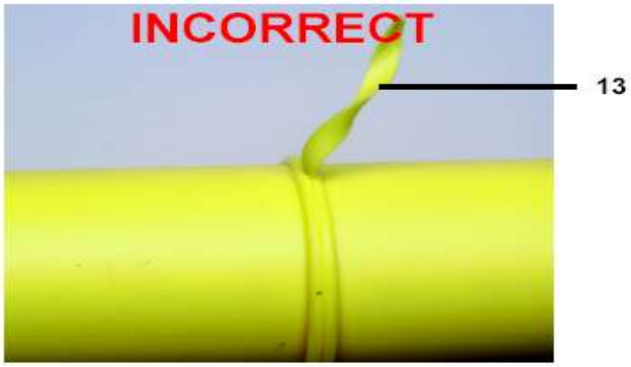
9. Insufficient heat time; melt bead too small

10. Excessive heat time or pressure applied during heating; melt bead too large

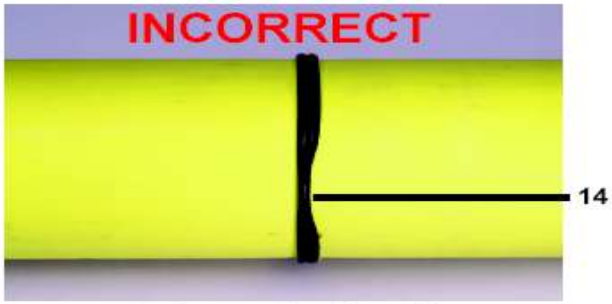


11. Pipe angled into fusion unit

12. Improper "High-Low" alignment



13. Incomplete face off or failure to re-



14. Incomplete face off

Factory Tapered Ends

- An abnormal High-Low is often apparent; especially if both ends are not faced equally, or if a factory end is mated to a cut end.

- Solution: Cut off or face back the factory taper.

Butt Fusion of Factory Ends

Case study:

- The Operator's contractor performing heat fusion did not verify the heating temperature. When the temperature was verified, the temperature was not within the procedural specification.

How do you measure plate temperature?

In accordance with a written procedure.

Expensive, but accurate.

Inexpensive, but less accurate.

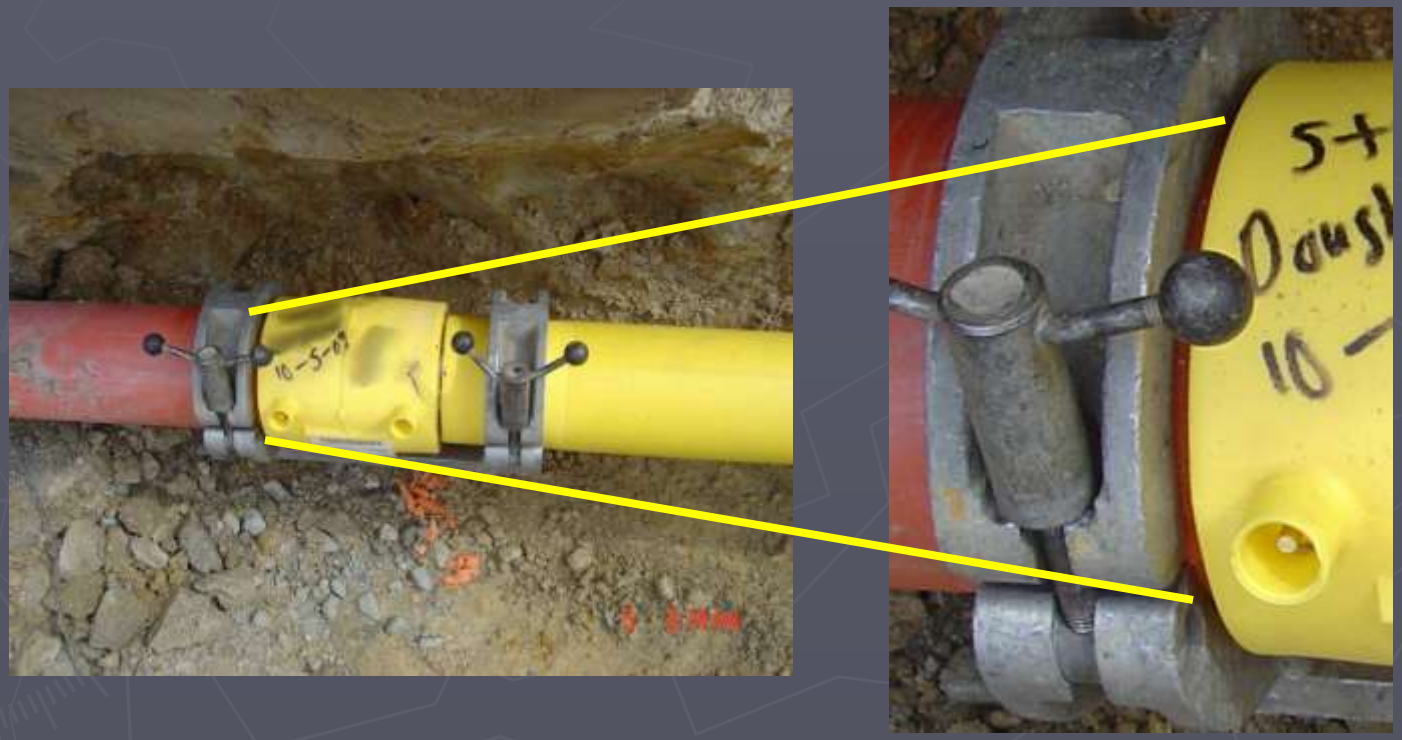
Check plate temperatures at several locations, such as the 12, 3, 6, and 9 o'clock Locations…


02/

Case study:

The Operator did not mark the proper stab depth before performing an electrofusion.

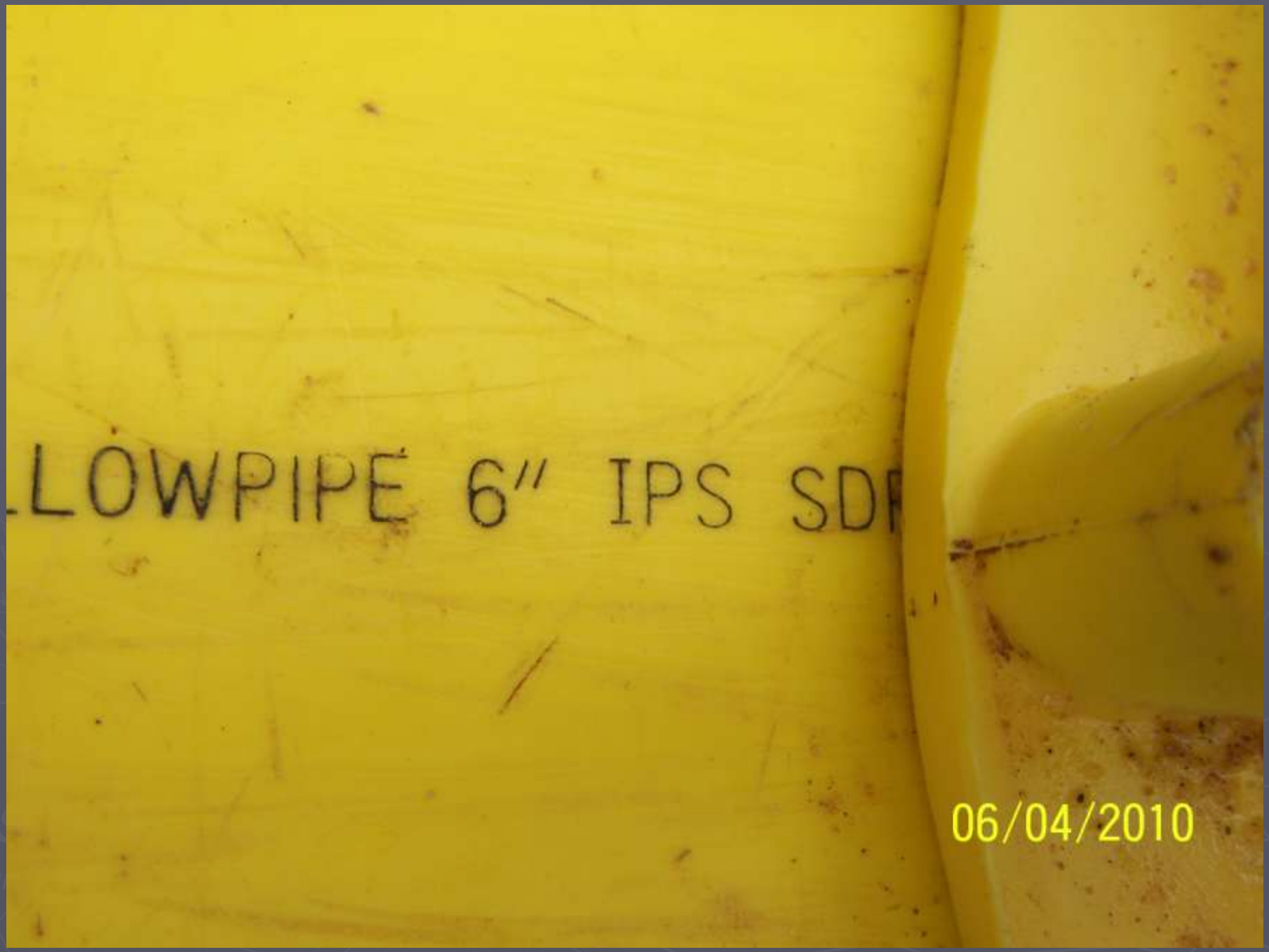
Another example of not marking the proper stab depth before performing an electrofusion.




Good example of marking the pipe before performing a butt-fusion to verify the pipe did not slip in the clamps.

Case study:

- During an inspection of electrofusion tees, the inspector was concerned that the pipe was not scraped at all
- Later determined that a minimal amount of scraping had occurred
- Destructively tested 6 joints of concern – 5 failed
- Excavated many electrofusion joints
- Paint scrapers no longer allowed


LOWPIPE 6" IPS SDR
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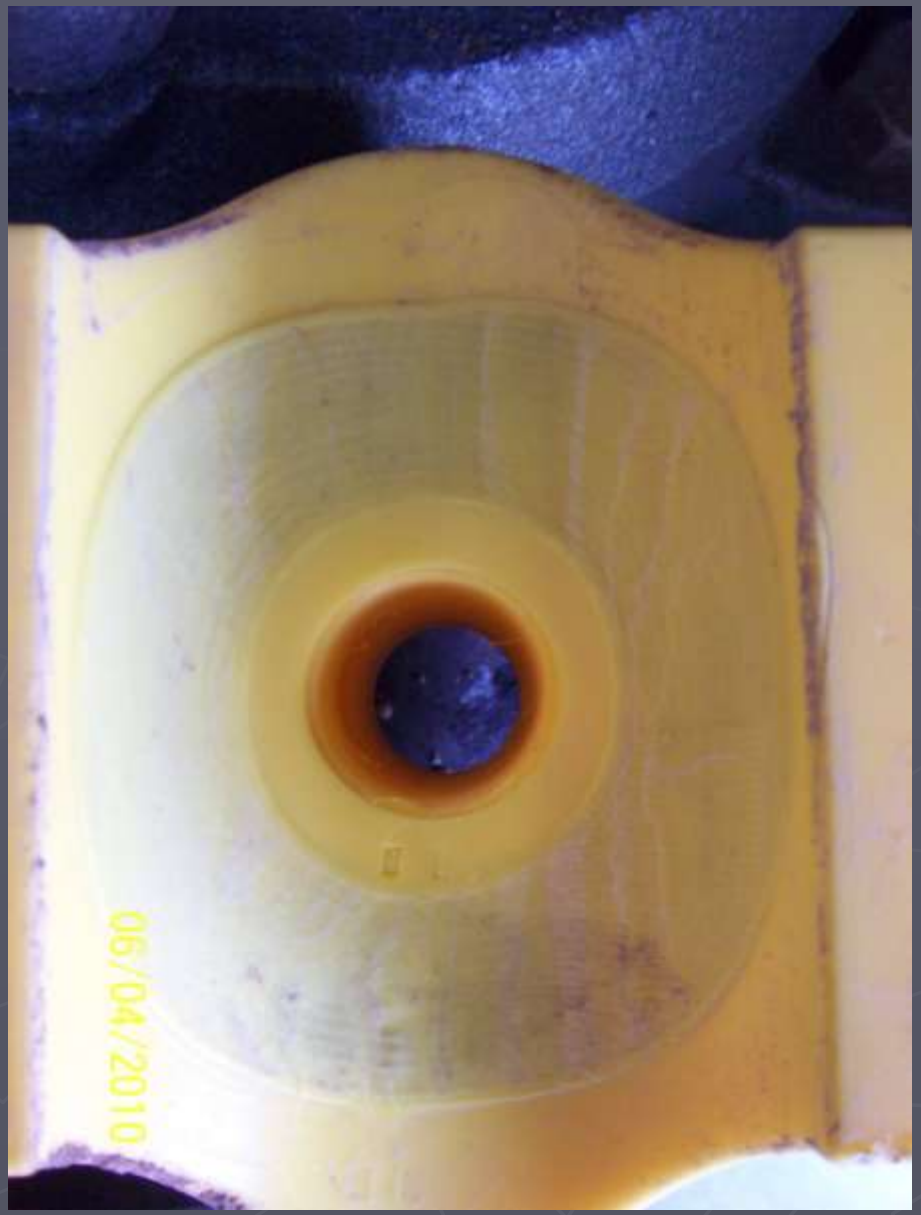
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(c)(1) A person must be re-qualified if during any 12 month period that person does not make any joints under that procedure

OR

(c)(2) A person must be re-qualified if during any 12 month period that person has 3 joints or 3 % of the joints made…that are found unacceptable

OR

MORE LIKELY

Company procedures require annual requalification

Case study:

- **The Operator's contractor performing heat fusion had an expired joining card.**

Who's responsibility is this?

Ultimately, it's ALWAYS the operator's responsibility to ensure compliance.

§192.321(e) Installation of Plastic Pipe

...tracer wire may not be wrapped around the pipe and contact must be minimized, but is not prohibited


Is this a violation?


How is this line going to be marked?

§192.605(b)(3) Maps

The [O&M] manual … must include procedures … to provide safety during maintenance and operations… [including] making construction records, maps and operating history available to appropriate operating personnel

Case study:

- LEXINGTON, MA – 2005

  PLANS APPEARED TO SHOW A GAP IN THE 60 PSIG SYSTEM. ACTUALLY, IT WAS GAP BETWEEN THE 60 PSIG SYSTEM AND THE 2 PSIG SYSTEM.

Do these maps and records need to be accurate and complete?

§192.751 Prevention of Accidental Ignition

Each operators shall take steps to minimize the danger of accidental ignition of gas…


FIRE EXTINGUISHER
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CAUTION
TO RECHARGE
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UNDERWRITERS LABORATORIES
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17/06/2009
PEMALL

§192.805(b) Operator Qualification

Ensure through evaluation that individuals performing covered tasks are qualified

§192.805(c) Operator Qualification

Allow individuals that are not qualified … to perform covered tasks if DIRECTED and OBSERVED by an individual that is qualified

- Not everybody is qualified for everything – that is ok
- However, you must have a plan in place to ensure only qualified people are doing the work or to ensure that unqualified people are DIRECTED AND OBSERVED by a qualified person
- Companies are not doing a good job of knowing who is or is not qualified for certain tasks in the field
- Companies do not have a good program in place for DIRECTING AND OBSERVING tasks

STILL MISSING IN ACTION

Pulling Pipe in Trenchless Construction

§192.321(c)
Installation of Plastic Pipe

Plastic pipe must be installed so as to minimize shear or tensile stresses.

- The GPTC Guide for Horizontal Directional Drilling for Plastic Pipe recommends a weak-link or breakaway device if the Allowable Tensile Load (ATL) of the pipe can be exceeded.
- The ATL can be calculated with ASTM F1804 and the formula is also provided by many pipe manufacturers.

Allowable Tensile Load (Pounds)

$$ATL = \pi D^2 f_Y f_T T_Y \left(\frac{1}{DR} - \frac{1}{DR^2} \right)$$

Where

ATL	=	allowable tensile load, lb
D	=	pipe outside diameter, in
f_Y	=	tensile yield design (safety) factor, Table 29
f_T	=	time under tension design (safety) factor, Table 29
T_Y	=	pipe tensile yield strength, lb/in^2 (Table 30)
DR	=	pipe dimension ratio (DR or SDR)

Weak-Links (Breakaways)

Calculated Weakened Pipe

Mechanical

Case study:

- The Operator's contractor is performing a HDD pullback without the use of a weak link.
- They say it's acceptable because they are continuously monitoring the pressure. However, the ATL is measured in pounds. Is this credible?

Service Lines & Risers

§192.361(d)
Service lines: Installation

Each service line must be installed so as to minimize anticipated piping strain…

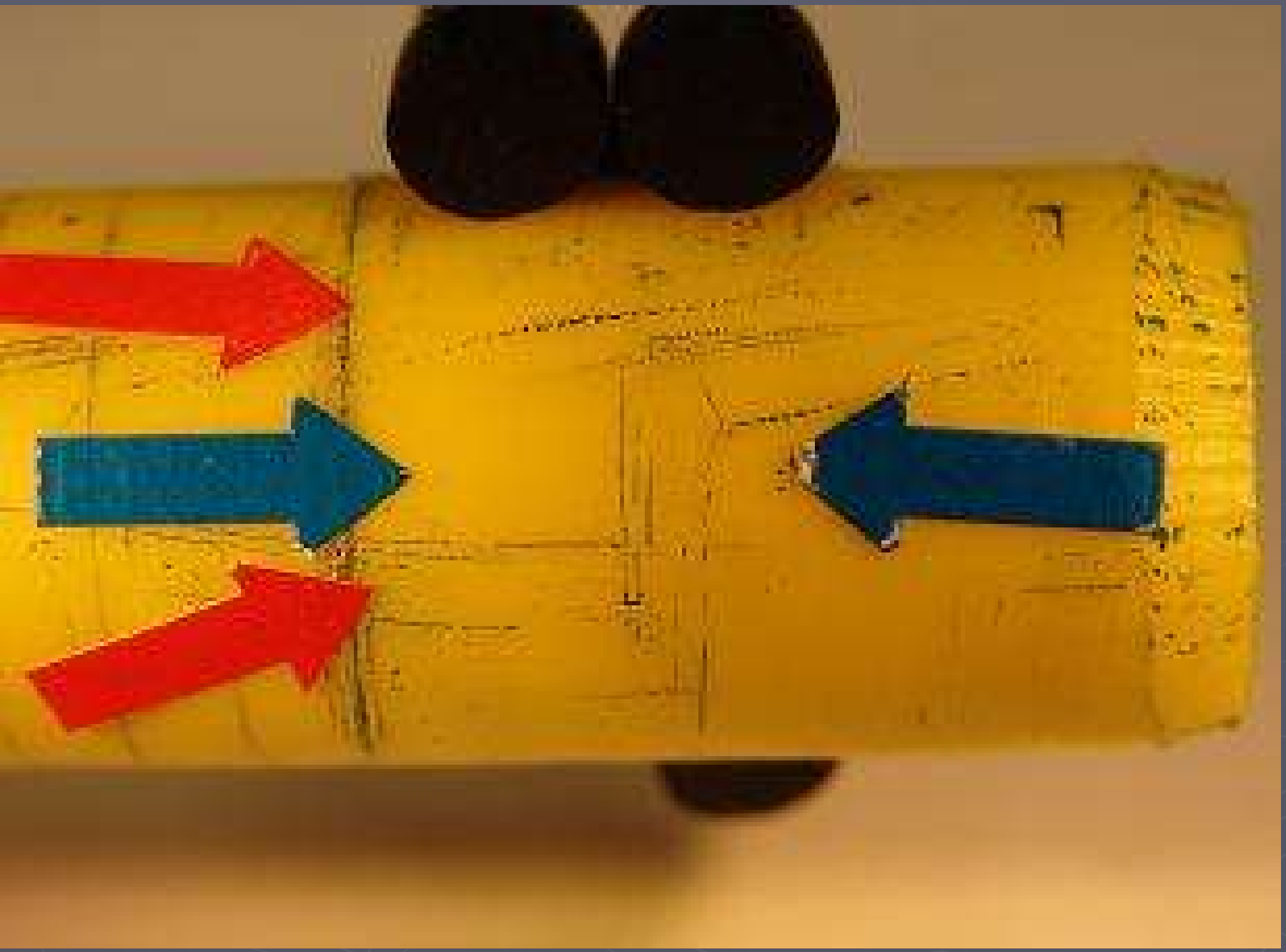
Case study:

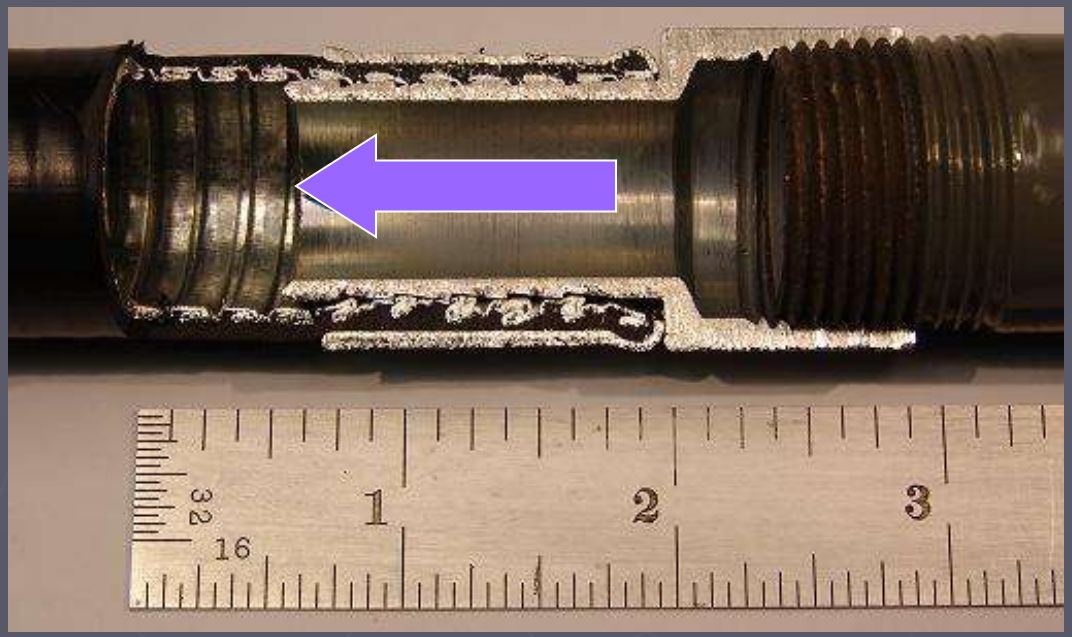
- The Operator's contractor performing a branch service installation shortened two anodeless risers. There was no procedure for this activity.

MacGyver?

Another Case study:

- **This time the Operator had a written procedure to assemble anodeless risers but unfortunately the parts supplied were leading to on site failures.**

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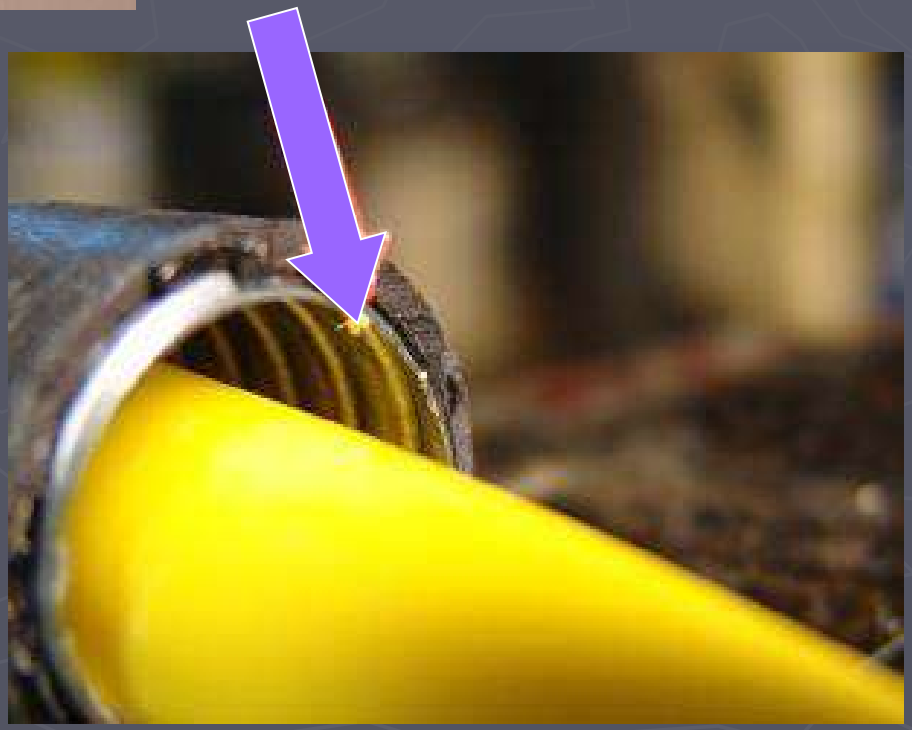


§192.375(a)(i) Service Lines: Plastic

Each outside plastic service line must be installed in a manner to protect the plastic service line against deterioration and external damage.

Case study:

- The Operator's contractor installed service stubs above ground that were left above the ground for several years.

§192.375(a)(i) - Failure to install a service line in a manner to protect the above ground level part of a plastic service from deterioration and external damage.

Another Case study:

- The Operator installed a temporary gas service above ground over a garage.

Underground Clearance

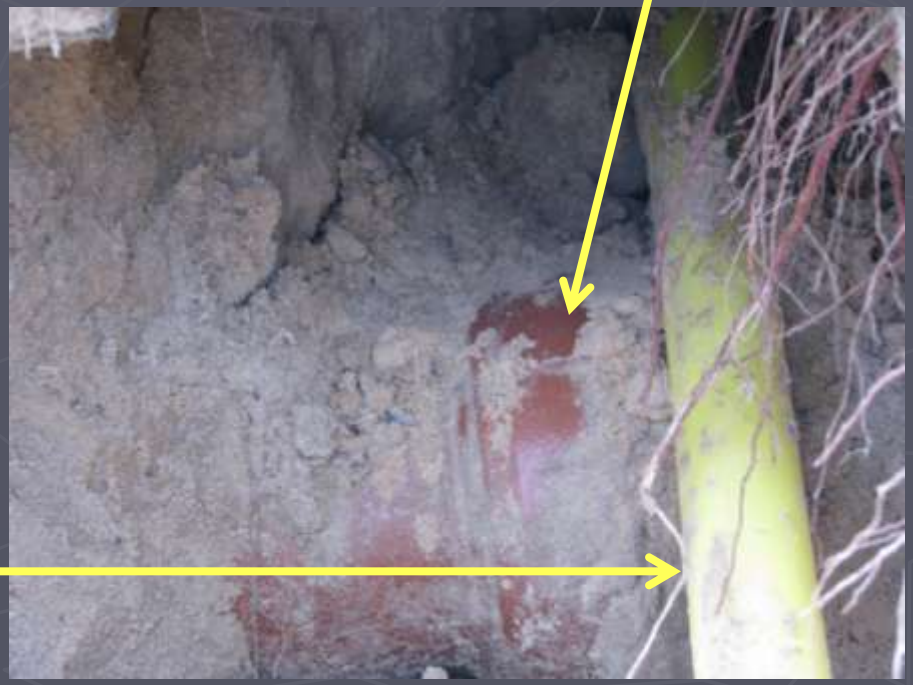
§192.325(b) Underground clearance

Each main must be installed with enough clearance from any other underground structure to allow for proper maintenance

§192.325(b) - Failure to install a main with enough clearance from any other underground structure to allow for proper maintenance

Electric Line

Sewer Line



2” Plastic Gas Main


Tracer Wire
Service Lines
LUMBER • KITCHENS • HOME CENTER
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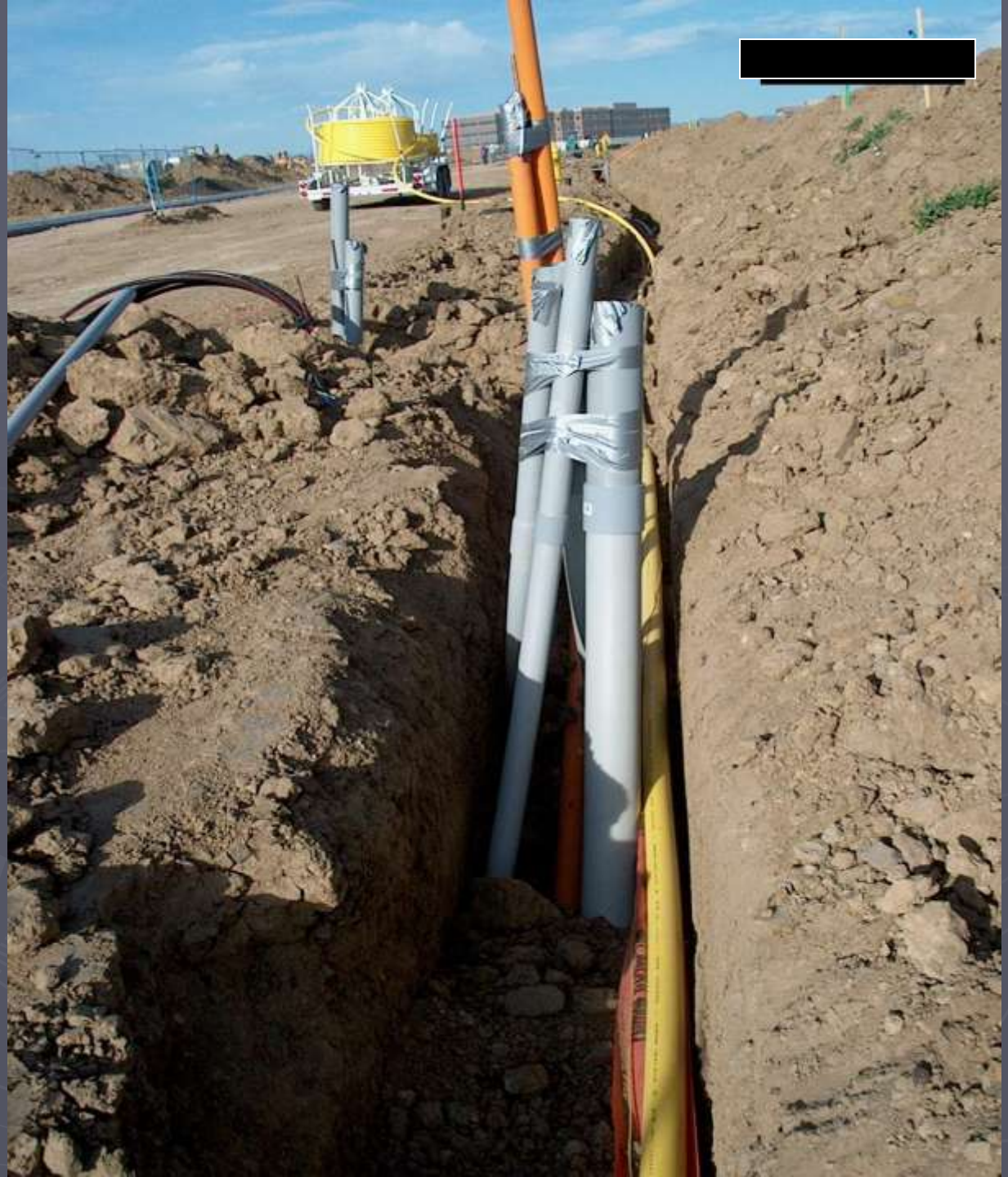


PB2001-916501
NTSB/PAR-01/01

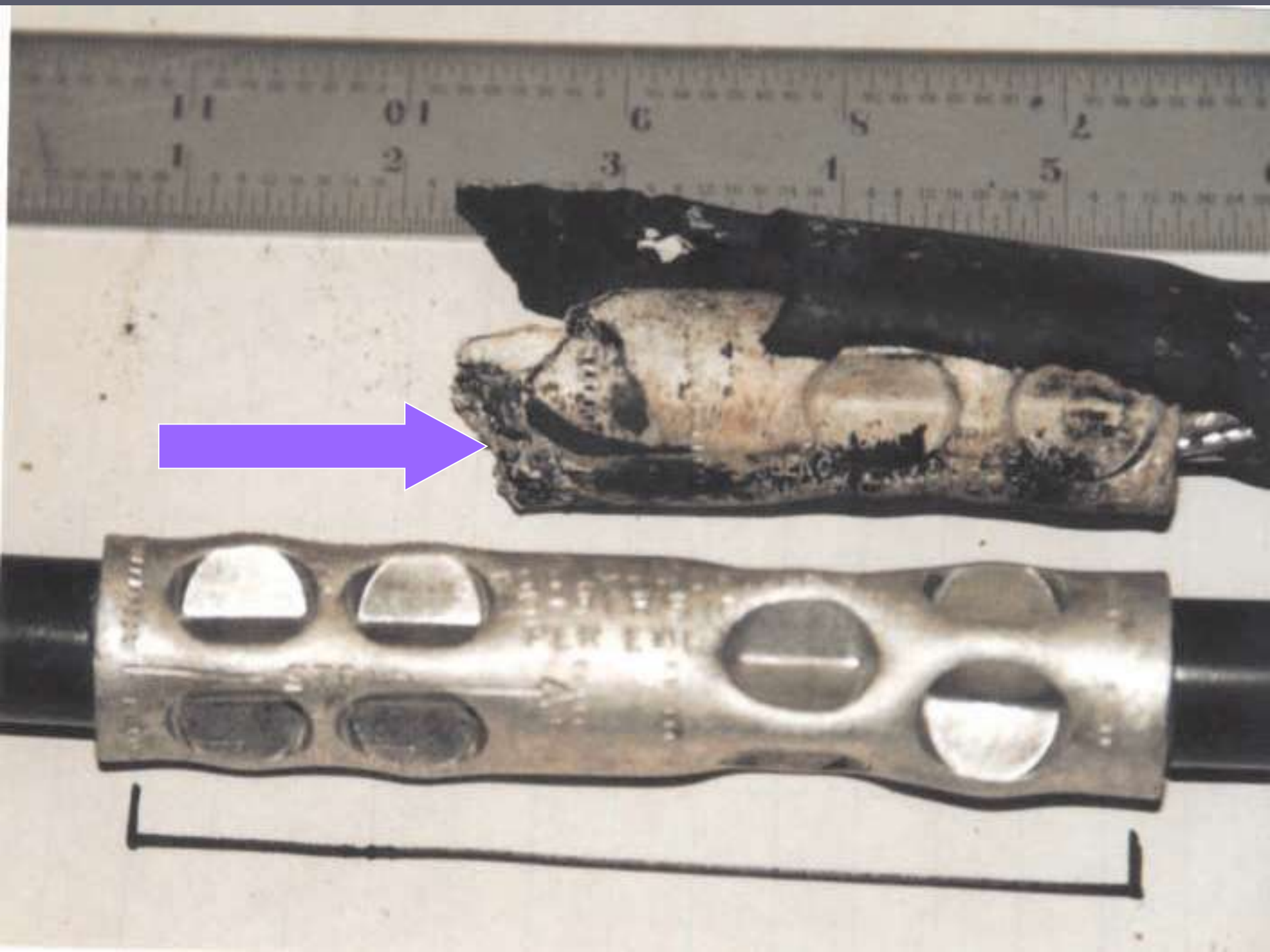
NATIONAL TRANSPORTATION SAFETY BOARD

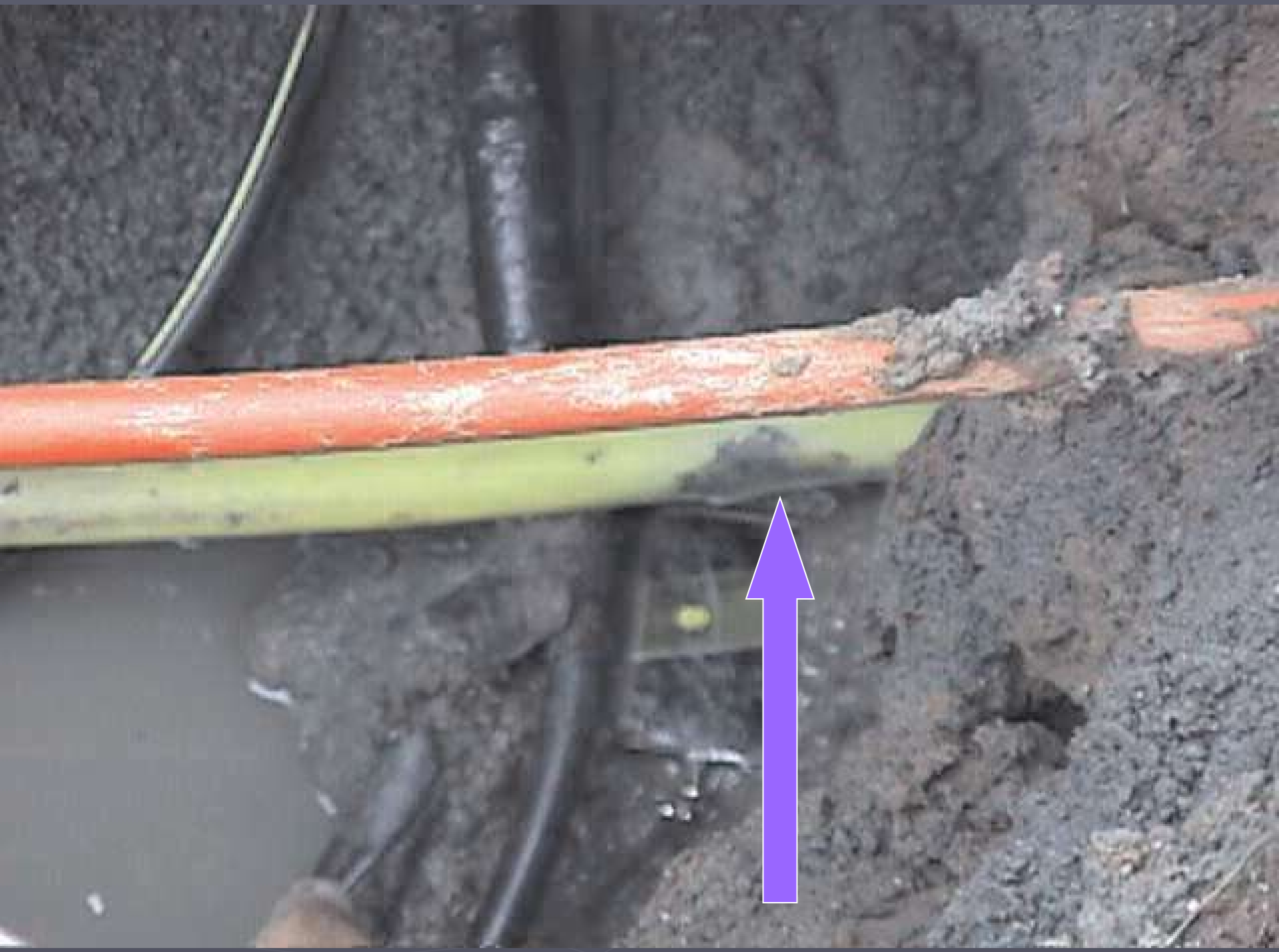
WASHINGTON, D.C. 20594

PIPELINE ACCIDENT REPORT

NATURAL GAS EXPLOSION AND FIRE IN
SOUTH RIDING, VIRGINIA
JULY 7, 1998

7366





Forestville, Maryland

11 Years Later

Penn Mar Mall

2nd Part

§192.325(b) Underground clearance

Each main must be installed with enough clearance ... to protect against damage that might result from proximity to other structures.


Steam Line
Plastic Gas Main

Grounding rod right next to the service

Backfill

§192.319(b)(2) Installation of Pipe in a ditch

When a ditch is backfilled it must be backfilled in a manner that prevents damage to the pipe from the backfill material.

Case study:

- The Operator's contractor installed a 4" plastic main with improper backfill material. About 2500' (about a ½ mile) of the newly installed 4" gas main was replaced and select backfill was brought in.

§192.319(b)(2) - Backfill in a manner that prevents damage to the pipe from the backfill material.


GAS
BELOW

Grounding & Squeezing

§192.605(b)(9) O&M Procedures

...Take adequate precautions to protect personnel from the hazards of unsafe accumulations of the vapor of gas.

Case study:

- The Operator was performing a tapping process without properly grounding the cutting tool. A failure of the operator to follow procedures.

§192.605(b) O&M Procedures

Failure to have adequate procedures for squeezing off a pipeline.

§192.605(b) - Failure to have adequate procedures for squeezing off a pipeline.

Industry Standards and Pipe Manufactures Recommend

- The squeeze off tool must be at least 3 pipe diameters, or 12 inches, whichever is greater, away from any butt fusion, or any socket, saddle, or mechanical fitting.


Example of a Squeeze off tool with the grounding wire and rod already attached.

Cover Depth

§192.327(b) - Failure to install a main with at least 24 inches of cover.

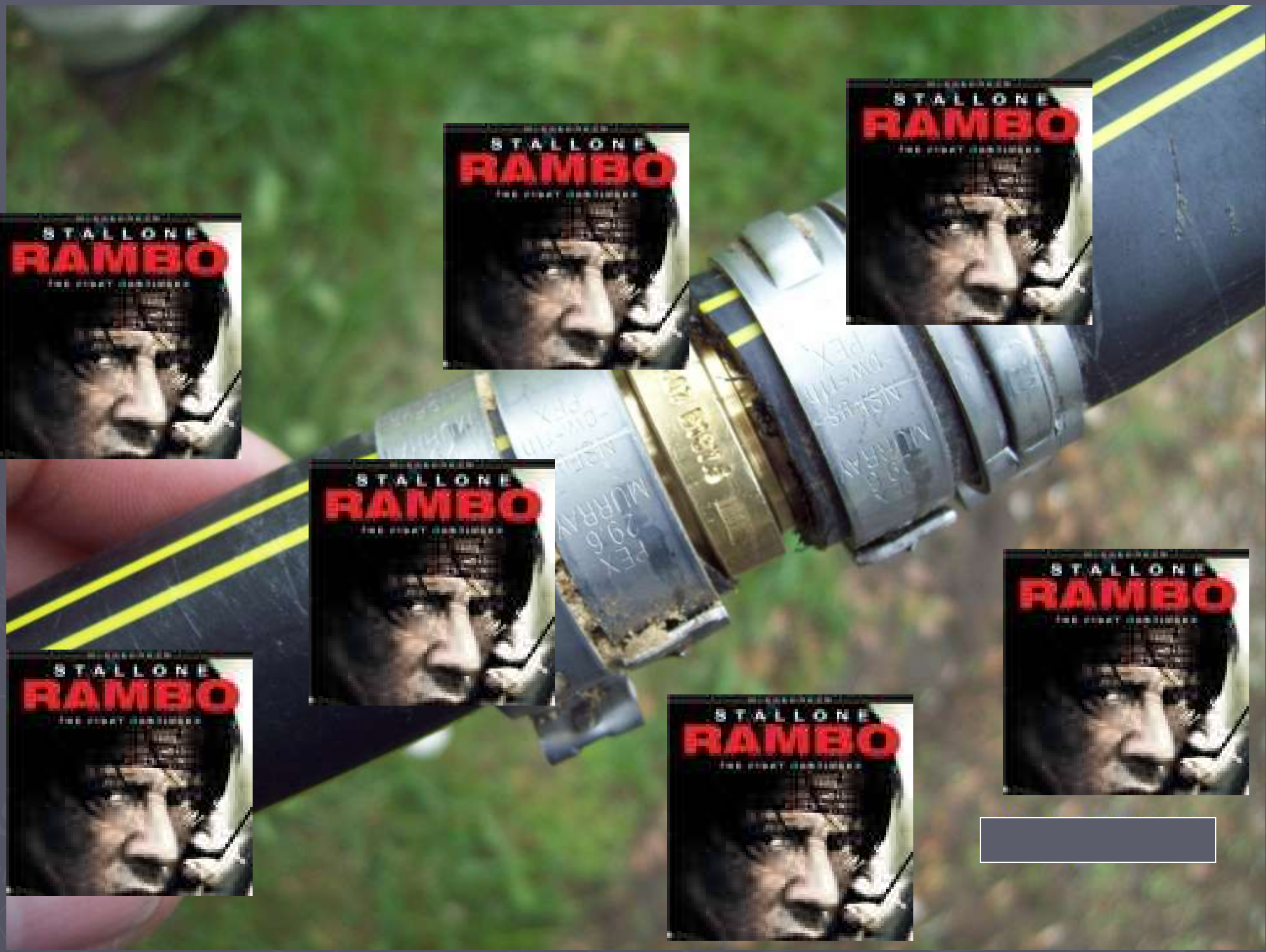
Was production a priority over safety?

Special Tools

Special Fittings

Just Plain Special!


PEX


STALLONE
RAMBO
THE FIRST BLOODBACK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FUNERAL HOME
Since 1965
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BP

Ripped heater bag and dirty heat plate.

Rusty facing blades, you're prone to failure.

In conclusion:

The plastic gas pipe you install today should be around 100+ years from now; 2110…

Don't bury your mistakes.

They ~~may~~ will come back to haunt you!

The End

Thank You!